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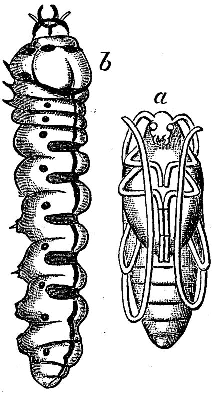
those above mentioned, being an inch or a little more in length. It is gray, irregularly striped with ochre, and the wing-covers end in a sharp point. The grub (Fig. 119*a*; *b*, top view of the head; *c*, under side) is about two inches long and whitish yellow. It has, with that of the Broad-necked Prionus (*P. laticollis* of Drury, Fig. 120 and pupa), as Harris states, "almost entirely destroyed the Lombardy poplar in this vicinity (Boston). It bores in the trunks, and the beetle flies by night in August and September. We also figure the larva of another borer (Fig. 121*c*; *a*, top view of the head; *b*, under side; *e*, dorsal view of an abdominal segment; *d*, end of the body, showing its peculiar form), the *Saperda inornata* of Say, the beetle of which is black, with ash gray hairs, and without spines on the elytra. It is much smaller than any of the foregoing species, being nine-twentieths of an inch in length. Its habits are not known. We also figure, from the manuscript work of Abbot, the larva and pupa (Fig. 122, *a*, pupa; *b*, larva) of *Monohammus titillator* of Fabricius, but he does not state on what tree it feeds. We copy also a figure of the larva and pupa of *Chion cinctus* (Fig. 123, *a*, pupa; *b*, larva), from the same work. The author gives no account of its habits.

Fig. 123.



Chion cinctus, larva and pupa.

SPRINGTIME ON THE YUKON.

BY W. H. DALL.

HAVING joined the readers of the NATURALIST in a winter day's journey on the Ulukuk portage not long since, we may, if so inclined, try our fortune again together, in the more pleasant springtime, and gather what facts we may of interest and value during another day, spent on the great river of the northwest, and its shores.

The spring, after the middle of March, comes on with eager steps in the Yukon Territory. The days lengthen so rapidly that the change is almost perceptible from one day to another. The great snow blanket, from six to eight feet thick, which covers the whole country, sinks and hardens from day to day. A tremulous mist, quivering like the hot air above a heated iron, hovers over the brilliant surface of the snow crust, and to this is due the painful inflammation of the eyes (conjunctivitis) which is only too familiar to the northern voyageur under the name of "snow blind." To avoid it, we don a pair of dark green glass goggles, or the wooden goggles of the Eskimo, which admit the light only through a narrow slit in the blackened wood, warding off the reflected light; yet even through these the surface of a hill or river appears most dazzling, so intense is the snow glare. Early in April the long hot days and short nights are felt and their results indicated, by the water which covers and softens the ice sheets on lakes and rivers. Shirt sleeves are the rule, and open casements let in the unaccustomed sunlight without stint, while the dark parchment windows of winter are laid aside.

On the tenth of April, though the whole country was white with the half melted snow sheet, flies, to all appearance the familiar blue bottle and housefly, clustered in myriads on the sunny side of the wall of the Nuláto trading post. The same day I found the velvety crimson catkin of the alder (how many of our readers have ever seen it?) side by side with the silvery one of the river willow, and searching among the poplars for new arrivals, brought down a white-winged crossbill, the first of the season. A day or two later, the turfed roof of my log dwelling was alive with small steel green beetles, redolent with a musky odor, and by carefully scanning the few spears of dry grass and green tufts of moss which appeared above the surface of the snow, I found several other smaller species sunning themselves, unconscious of the presence of an enemy. The short-tailed field mice (*Arvicola xanthognathus* and *A. Gapperi*) were waking up to a sense of the situation and enjoying themselves on the river bank wherever a projecting root or stone offered a shelter from the keen eyes of the numerous hawks which ever and anon sailed overhead. Another reason for coming abroad was, that the melting snow was making their underground establishments very damp and uncomfortable.

The Canada jay, known all over the northern country by the less euphonious name of "whiskey jack," had already laid and almost hatched its eggs. The goshawk and the duck-hawk (*Astur atricapillus* and *Falco anatum*) had put their nests in order, and some of them had one egg as an earnest of what was coming. The ptarmigan (*Lagopus albus*) began to show rich dark brown feathers on the head and neck and on the edges of the wings. Owls (*Syrnium cinereum*, *Nyctea nivea*, *Nyctale Tengmalmi*, etc.), were abundant and attending to pressing domestic affairs.

Toward the end of April I climbed a tall, dead stump, once a noble birch (*Betula incana?*), and found, in the cavity at the upper end, six smooth white eggs. While transferring them to my knapsack the head of the family came home, and careless of personal risk or even death, dashed wildly about my head, knocking off a loose cloth cap which I wore, and screaming with sorrow and anger. The female owl, for it was a hawk owl's nest (*Surnia ulula*), soon joined him; and they flew to the top of a neighboring spruce, uttering cries of indignation to each other. Reaching the ground I soon quieted them, bringing both down with a single shot, and thus devoted the whole family to the interests of science.

On the third of May, Kurilla, my indefatigable Indian hunter, killed a white-cheeked brant (*Bernicla leucopareia*) and two ducks, a mallard and a golden eye (*Bucephala*

Americana), receiving therefor the usual perquisite of a pound of tobacco for the first goose of the season. From this time forward, wild fowl might be expected in abundance. On the twelfth of May the ice came down with a rush in the small rivers; and that on the Yukon grew every day more unsafe. No salmon were to be expected for some weeks, but large numbers of "blanket fish" (a species of *Thymallus*) were to be seen ascending the small rivers. They would not take the hook, though the greatest inducements were offered, nor will any other fish found in the Yukon, as far as I know.

The ice on the Yukon breaks up about the twentieth of May. The earliest season known for many years brought open water on the sixteenth, and the latest on the twenty-fifth of the month.

On the twentieth of May I saw a fine specimen of the Camberwell beauty (*Vanessa antiopa*) and after that other butterflies were not uncommon, though they are more plenty toward the middle of June.

Waiting until the ice and logs are well out of the river and the freshet has somewhat subsided, let us take a small skin canoe and spend a day on the river. The sun is bright and warm; the weather clear and delightful; every living thing is pulsating with the energetic life of the Arctic spring. A gun, ammunition, axe, teakettle, and a few other indispensable articles constitute our equipment.

Shoving off from the muddy shore of the Nuláto river-bank, the blood springs, and the nerves tingle with the smart strokes of the paddle, which send us shooting over the turbid waters; laden as they are with sticks, refuse, and small cakes of ice, the remnants of the freshet, which last has carried the heavier logs and larger fragments seaward some days ago.

Hugging the bank to avoid the swifter current, the feathery willows and glistening tender leaves of the poplar (*P. balsamifera*) overshadow us, and small curculionid beetles frequently drop into the boat from the overhanging boughs finding a safe harbor in our collecting bottles. The species are numerous but the individuals few. Two or three Indians in their small, frail, birch canoes, accompany us, on their way to some small river flowing into the Yukon. There they will spend a week or two hunting the beaver, driven from his house by the rise of the spring floods. These dusky aborigines notice our eager capture of beetles, and such small game, with unconcealed amusement, but are keenly alive to the fact that good specimens will buy needles, caps, or tobacco, and regulate their actions accordingly. As we round a bare point where the sun shines warmly on the fragrant grass and the saxifrage is already in blossom, a flight of swallow-tailed butterflies (*Papilio Turnus* and *P. Aliaska*) come sailing along, and immediately all is excitement. Paddles are wildly brandished in the air, the light canoes dart swiftly hither and thither, and the unconscious insects, thus assailed, escape with a loss of half their number. Then our Indian companions, with some incomprehensible witticism passing between themselves, bring in the results of their foray, and so some eight or ten passable specimens are added to our collection at the expense of a few needles and half a dozen percussion caps.

Away go the light canoes again, keeping admirable time with their paddles to a chant of which the following may be taken as a free translation : —

Where is the salmon, the big chief salmon?
Ha! He! Ha! Hah! Hah! Hah!
His sides are scarlet, his tail is mighty,
Ha! He! Ha! He! Ha! Ha!
Fat and luscious the steam of the kettle;
Hunger flies, when the salmon rises;
Rich and sweet are the tails of beaver,
Fat the deer, in the summer season,
And the bear in the early autumn;
Better still is the great fat salmon!
Ho! Ho! Ho! Ha! Ha! Ha!

and so on with an indefinite amount of interpolated chorus.

A little break in the green bank, where a small stream dashes its clear cold water into the muddy Yukon-tide, offers an inviting nook, and into it we haul our bark, and, making fast to a projecting willow root, scatter in search of "specimens." A tough climb of ten minutes takes us to the top of the brown sandstone bluff, broken and weatherworn; yet showing, in its successive layers of clayey and sandy rock with thin laminæ of fossil vegetable matter, that, in ages gone by, the same forces were at work there, that we now observe on the recent river bank; each series of three layers shows how some flood came down and deposited first its sand, next its clay in the form of fine mud, and lastly any fragments of wood or vegetable matter which the receding waters left behind them. In the rocks above, however, a different state of things may be observed. Instead of the fragments of leaves of sycamores (*Platanus*), of carbonized wood, and of unrecognizable vegetable matter, we find remains of *fuci*, here and there a fragment which may have been of terrestrial origin; and, especially, remains of mollusca, mostly bivalves, such as oysters, mussels, and similar shell-fish, and very rarely a mass of remains which may once have been a fish. These fossils, though metamorphosed, broken, crushed, and frequently existing only as casts, are sufficient to indicate a miocene age for the rocks in which they occur, and no fossils of the older rocks have yet been found on the lower Yukon.

By turning over some of these prostrate trunks we shall obtain rare prizes in the shape of *Carabidæ*, beetles, frequently of brilliant colors and large size, of which some are so rare that an enthusiastic entomological friend once exclaimed to us, when parting: "Oh, if I thought I could discover the *Carabus Vittinghœvii*, I think I should leave my business and go with you!" In the same locations are to be found minute land shells (*Helix chersina*, *striatella*, *electrina* and others, as well as minute species of *Pupilla* and *Vertigo*, all common to the northern zone of the world, from Sweden to Labrador, though known under various local names.

Diptera, in the shape of mosquitoes, are only too common, as we have discovered long since, and one does not wonder that the deer and moose, to escape their persecution, plunge into the Yukon under the very eye of the hunter, to meet a certain doom.

Birds of the season are vocal in every bush; and here again we meet familiar acquaintances, perhaps the very same which have built their nests and reared their young under the roses and lilacs of Massachusetts. The common robin (*Turdus migratorius*), the much more beautiful and musical varied thrush (*T. nœvius*), the gray-cheeked thrush (*T. aliciœ*), the ruby-crowned kinglet (*Regulus calendula*), the yellow, black-capped, and yellow-rumped warblers (*Dendroica œstiva*, *striata* and *coronata*), the wax wing (*Ampelis garrulus*), the rusty blackbird (*S. ferrugineus*), and a host of others are everywhere about us, hardly noticing our presence, and intent on pleasing their newly found mates, by song, and twitter, and pretty, arch gymnastics, which, to the tender-hearted make the use of powder and shot, even for scientific purposes, little better than deliberate murder. Kurilla, at our side, says "the bushes are boiling over with birds!" And this reminds us that the sun is now high in the south, and we make our way toward the boat abandoning sentiment to boil the teakettle. On our way, a few low musical notes attract our attention just in time for us to see the author, a water ouzel (*Hydrobata Mexicana*), dive with a splash and patter into the little brook before us, and away, out of sight. Yonder is a beautiful rounded dome of moss, woven as closely as a Turkey carpet, and as smooth and even as the dome of St. Peter's, with a small round hole at one side, where our timid songster in due time will rear his family. Kurilla's gun is ever ready; he has reached the waterside before us and a magnificent mallard lies at his feet, which he has just shot, as it rose from yonder stump hidden in a bunch of alders. Parting the bushes we see him point triumphantly to an excavation in the decayed wood where lie six eggs, just laid and left in an evil moment by the parent. While we are thinking of the bereaved mother Kurilla's thoughts tend toward omelets, and the frying pan and a piece of deer-fat are soon produced. Duck roasted on a stick before the fire, is quite another thing from the embalmed remains which the hotels offer us, by way of game, and to our mind it is far superior. Our meal of duck, omelet, tea and bread being finished, we seat ourselves in the boat, cast off the lashings, and shoot out into the rapid current, leaving the mosquitoes, for a time at least, behind us; when, an hour afterwards we haul up on the beach at Nuláto and survey our trophies, some of us may conclude that pleasure as well as profit may be found, even in the wilderness which borders on the Yukon.

THE IMPREGNATION OF EGGS IN TROUT BREEDING.

BY A. S. COLLINS.

FOUR or five years ago the subject of this article would have been considered of little practical importance. Now, however, fish-breeding establishments in our country can be counted by the hundred; and every detail of the business is receiving close attention. I propose briefly to describe the method in which trout naturally impregnate their eggs, and then the various methods or modifications adopted by fish-breeders.

Natural Method of Spawning. Some time about the month of October (the time varying with the temperature of the water), the trout which have hitherto been scattered through the stream, begin to run up toward its sources. The place which they choose for a nest has always certain characteristics. It is chosen as near a spring head as possible,